



**Constellation
Energy Group**

**Nine Mile Point
Nuclear Station**

**September 22, 2003
NMP2L 2101**

**United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555**

**Subject: Nine Mile Point Unit 2
Docket No. 50-410
Facility Operating License No. NPF-69**

**Licensee Event Report 03-001, "Oscillation Power Range Scram due to Power
and Flow Perturbations Resulting from a Power Supply Failure"**

Gentlemen:

**In accordance with 10 CFR 50.73(a)(2)(iv)(A), we are submitting Licensee Event Report (LER)
03-001, "Oscillation Power Range Scram due to Power and Flow Perturbations Resulting from a
Power Supply Failure."**

Very truly yours,

**Lawrence A. Hopkins
Plant General Manager**

**LAH/KLE/bjh
Attachment**

**cc: Mr. H. J. Miller, NRC Regional Administrator, Region I
Mr. G. K. Hunega, NRC Senior Resident Inspector**

JE22

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory information collection request: 60 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to: bja1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

Nine Mile Point, Unit 2

DOCKET NUMBER (2)

05000410

PAGE (3)

1 OF 4

TITLE (4)

Oscillation Power Range Scram due to Power and Flow Perturbations Resulting from a Power Supply Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	24	2003	2003 - 001 - 00			09	22	2003	FACILITY NAME	DOCKET NUMBER
										05000
										05000
OPERATING MODE (9) 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)							
			20.2201(b)		20.2203(a)(3)(II)		50.73(a)(2)(II)(B)		50.73(a)(2)(ix)(A)	
POWER LEVEL (10) 100			20.2201(d)		20.2203(a)(4)		50.73(a)(2)(III)		50.73(a)(2)(x)	
			20.2203(a)(1)		50.38(c)(1)(I)(A)		X 50.73(a)(2)(iv)(A)		73.71(a)(4)	
			20.2203(a)(2)(I)		50.36(c)(1)(II)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)	
			20.2203(a)(2)(II)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER	
			20.2203(a)(2)(III)		50.46(a)(3)(II)		50.73(a)(2)(v)(C)		Specify in Abstract below or in	
			20.2203(a)(2)(iv)		50.73(a)(2)(I)(A)		50.73(a)(2)(v)(D)		NRC Form 366A	
			20.2203(a)(2)(v)		50.73(a)(2)(I)(B)		50.73(a)(2)(vi)			
			20.2203(a)(2)(vi)		50.73(a)(2)(I)(C)		50.73(a)(2)(vii)(A)			
			20.2203(a)(3)(I)		50.73(a)(2)(II)(A)		50.73(a)(2)(vii)(B)			

LICENSEE CONTACT FOR THIS LER (12)

NAME

James Spina Manager Maintenance

TELEPHONE NUMBER (include Area Code)

315-349-4848

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
E	EE	JRX	L045	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On July 24, 2003, at approximately 0550 hours, Nine Mile Point Unit 2 (NMP2) experienced a power supply failure resulting in power and flow perturbations that lead to an automatic reactor scram at approximately 0557 hours. NMP2 was at approximately 100 percent power when the power supply failed, and was at approximately 45 percent power at the time of the scram. The failed power supply affected main steam flow instrumentation, feedwater level control and reactor recirculation flow control. Oscillation Power Range Monitor (OPRM) channels 1 and 4 generated the scram signal when detected power oscillations met trip criteria.

The cause of the power and flow perturbations was the failure of non-safety related power supply C33-K611 (Lambda Model LRS-54-24). The power supply failed because of the age related failure of internal components and no preventive maintenance activity to refurbish or replace the power supply.

Corrective actions included replacing the failed power supply, and two similar non-safety related power supplies, with auctioneer style power supplies (Lambda Model LZS-250-3), and adding power supply C33-K611 to the preventive maintenance program. Additionally, activities were initiated to replace non-safety related power supplies whose failure could result in a reactor scram, impact mission critical equipment, or cause a significant plant transient.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a critical reactor scram.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)			PAGE (3)
Nine Mile Point, Unit 2	05000410	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2003	-- 001	-- 00	

NARRATIVE (If more space is required, use additional copies of NRC Form 365A) (17)

I. Description of Event

On July 24, 2003, at approximately 0650 hours, Nine Mile Point Unit 2 (NMP2) experienced a failure of instrument power supply C33-K611, which caused a partial loss of power to feedwater control, main steam flow instrumentation, and reactor recirculation flow control. Prior to the failure of the power supply, two feedwater pumps and two recirculation pumps were operating. The loss of power to recirculation relays resulted in both recirculation pumps shifting from fast speed to slow speed. The reduction in flow caused reactor power to drop from 100 percent to approximately 45 percent. The reduction in core flow caused the reactor to enter the exit region of the power to flow map in which core instability is possible.

The power supply failure also caused the loss of 3 out of 4 steam flow input signals to feedwater level control, which resulted in feedwater level control valve 2FWS-LV10A closing. Additionally, the power supply failure caused feedwater level control valve 2FWS-LV10B to fail "as is" at approximately 52 percent open. With 2FWS-LV10B at 52 percent open and reactor power reduced, reactor vessel level began to increase. To keep reactor water level from increasing further, operators secured reactor feedwater pump 2FWS-P1B. Upon securing feedwater pump 2FWS-P1B a reactor recirculation flow runback occurred, reducing power to approximately 35 percent. A false low reactor vessel water level, resulting from the failed power supply, coincident with only one running feedwater pump (after securing the B reactor feedwater pump) satisfied the recirculation flow runback initiation logic. Approximately three minutes after the recirculation flow runback, Oscillation Power Range Monitor (OPRM) channels 1 and 4 detected power oscillations and initiated an automatic reactor scram (a period based algorithm scram) at approximately 0557 hours. At the time of the scram, reactor power was approximately 45 percent and core flow was approximately 28 percent.

All control rods fully inserted. After the scram, the turbine bypass valves were used to control reactor pressure. Post scram, operators took manual-electric control of 2FWS-LV10A (from the control room) and used feedwater pump 2FWS-P1A to control reactor water level.

Troubleshooting determined that power supply C33-K611, a Lambda model LRS-54-24, had failed. A temporary power supply was installed in parallel with the failed power supply C33-K611 and power to control 2FWS-LV10B was re-established. Power supply C33-K611 is located in panel 2CEC-PNL612, along with power supplies C33-K612 and C33-K613. All three power supplies were Lambda model LRS-54-24 and all three were replaced with auctioneering type Lambda model LZS-250-3. The auctioneering type power supply reduces the single point vulnerability.

II. Cause of Event

The cause of the power and flow perturbations leading to the reactor scram was failed power supply C33-K611. The power supply failed because of the age related failure of internal components and no specific preventive maintenance program activity to refurbish or replace the power supply. Power supply C33-K611 was manufactured circa 1985. There was no specific preventive maintenance program activity to refurbish or replace the power supply. Contributing causes were the lack of power supply redundancy for important operational loads and inadequate distribution of loads on the power supply, i.e. the powering of 3 out of 4 main steam line flow instruments from one power supply. The significance of the load distribution is reduced by using the auctioneering type power supply.

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

III. Analysis of Event

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a critical reactor scram.

Given the power supply failure, the feedwater system and recirculation system responded as designed.

All control rods fully inserted.

Reactor Core Isolation Cooling was available post scram but was not needed.

No Emergency Core Cooling Systems actuated or should have actuated.

A General Electric evaluation confirmed that Minimum Critical Power Ratio (MCPR) safety limit protection was provided by the OPRM reactor trip.

A probabilistic risk assessment of the event concluded that the estimated Conditional Core Damage Probability for the event was less than 1E-6 and therefore, the event was not considered risk significant.

Based on the above, the event did not pose a threat to the health and safety of the public.

IV. Corrective Actions

1. Power supply C33-K611 and two additional power supplies (C33-K612 and C33-K613) were each replaced with an auctioneer style power supply, Lambda Model LZS-250-3.
2. Activities were initiated to replace non-safety related power supplies whose failure could result in a reactor scram or impact mission critical equipment, or cause a significant plant transient.
3. An engineering evaluation of load redistribution on power supply C33-K611 has been initiated.
4. Power supply C33-K611 was added to the preventive maintenance program.

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

V. Additional Information

1. **Failed Components:**
Lambda power supply, Model Number: LRS-54-24, Manufacturer: Lambda Electronics
2. **Previous similar events:**
Licensee Event Report 89-024, "Manual Scram Due to Equipment Failure and Entry into Restricted Zone," documents the failure of a Lambda LRS-54-24 power supply on September 8, 1989. The cause of the reactor scram was identified as failure of the power supply. The cause of the power supply failure was not identified.
3. **Identification of components referred to in this Licensee Event Report:**

<u>Components</u>	<u>IEEE 805 System ID</u>	<u>IEEE 803A Function</u>
Feedwater System	SJ	N/A
Mainsteam System	SB	N/A
Turbine Bypass	TG	N/A
Oscillation Power Range Monitors	IG	N/A
Reactor Protection System	JC	N/A
Recirculation System	AD	N/A
Reactor Core	AC	N/A
Reactor Core Isolation Cooling System	BN	N/A
Instrument Power System	EE	N/A
Control rod	AC	ROD
Pump	AD	P
Valve	SB, TG, AD	LCV, PCV, FCV
Power Supply	SJ, SB, AD, EE	RJX
Reactor Vessel	AD	VSL
Panel	EE	PL
Flow Indicator	SB	FI
Relay	AD	RLY